

What is claimed is:

1. An orientation independent dental powder applicator comprising:
 - a powder reservoir having an inner porous wall extending around a longitudinal axis and surrounding an inner chamber, and an outer porous wall extending around the inner porous wall;
 - an outer circumferential plenum chamber extending around the longitudinal axis and substantially surrounded by the outer porous wall;
 - an introductory circumferential plenum chamber extending around the longitudinal axis and substantially surrounding the outer porous wall;
 - a dental powder located in the powder reservoir between the inner porous wall and the outer porous wall;
 - a desiccant chamber containing a desiccant material having a first end with an air input opening and a second end fluidly coupled to the introductory circumferential plenum chamber of the powder reservoir; and
 - an applicator tube comprising a proximal end fluidly coupled to the inner circumferential chamber and a distal end adapted to deliver the dental powder to a dental site.
2. The dental powder applicator of claim 1 further comprising a membrane located within the introductory circumferential plenum chamber extending around the longitudinal axis and substantially surrounding the outer porous wall.
3. The dental powder applicator of claim 1 wherein the outer porous wall comprises a plurality of openings.
4. The dental powder applicator of claim 3 wherein a portion of the openings are adapted to direct pressurized air generally toward the longitudinal axis.

5. The dental powder applicator of claim 3 wherein a portion of the openings are adapted to direct pressurized air randomly within the powder reservoir.
6. The dental powder applicator of claim 3 wherein the openings comprise a regular or irregular pattern in the outer porous wall.
7. The dental powder applicator of claim 3 wherein the openings direct pressurized air into the powder reservoir to substantially fluidize the dental powder.
8. The dental powder applicator of claim 1 wherein the inner porous wall comprises one or more of a mesh screen, a membrane, a filter media, a perforated sheet material, synthetic woven materials.
9. The dental powder applicator of claim 1 wherein the inner porous wall comprises openings having a maximum cross-sectional dimension of from about 50 microns to about 1 millimeter.
10. The dental powder applicator of claim 1 wherein the outer porous wall comprises a length measured in a direction of the longitudinal axis that is from at least about two to about 10 times greater than a maximum gap between the inner porous wall and the outer porous wall.
11. The dental powder applicator of claim 1 wherein the inner porous wall comprises a cylinder, a cone, or a continuously curved surface.
12. The dental powder applicator of claim 1 wherein the powder reservoir comprises a cartridge releasably attached to the desiccant chamber, the acceleration chamber or both.

13. The dental powder applicator of claim 1 wherein the applicator tube is releasably attached to the powder applicator.

14. The dental powder applicator of claim 1 wherein the applicator tube is rotatably attached to the powder applicator.

15. The dental powder applicator of claim 1 wherein the applicator tube comprises a nozzle with an orifice at the tip to purge dental powder from the applicator tube.

16. The dental powder applicator of claim 1 comprising an acceleration chamber fluidly coupled between the inner circumferential chamber and the applicator tube.

17. The dental powder applicator of claim 16 wherein the acceleration chamber comprises an airfoil around which the dental powder passes en route to the applicator tube.

18. The dental powder applicator of claim 1 wherein the acceleration chamber comprises an airfoil connected to a control rod that is adapted to displace the airfoil within the acceleration chamber.

19. The dental powder applicator of claim 1 wherein the acceleration chamber comprises an airfoil adapted to be displaced into a sealing engagement with the proximal end of the applicator tube.

20. The dental powder applicator of claim 1 comprising a control rod controlled by a control rod actuator.

21. The dental powder applicator of claim 1 wherein the dental powder applicator is connected to a pressurized air source at a first end of the desiccant chamber.
22. The dental powder applicator of claim 21 wherein the pressurized air source is compressed air, nitrogen, helium, argon, or a mixture thereof.
23. The dental powder applicator of claim 21 wherein the pressurized air source is controlled by a pressurized air manual switch or foot pedal.
24. The dental powder applicator of claim 1 wherein the dental powder is a contrast medium.
25. The dental powder applicator of claim 1 wherein the dental powder is TiO_2 .
26. An orientation independent dental powder applicator comprising:
 - a powder reservoir having an introductory circumferential plenum chamber extending around a longitudinal axis;
 - an inner porous wall extending around a longitudinal axis and substantially surrounding the introductory circumferential plenum chamber;
 - an outer porous wall extending around the inner porous wall and substantially surrounding an inner circumferential chamber;
 - an outer circumferential plenum chamber extending around the longitudinal axis and substantially surrounded by an outer wall;
 - a dental powder located in the inner circumferential chamber;
 - a desiccant chamber containing a desiccant material having a first end with an air input opening and a second end fluidly coupled to the introductory circumferential plenum chamber of the powder reservoir; and

an applicator tube comprising a proximal end fluidly coupled to the outer circumferential plenum chamber and a distal end adapted to deliver the dental powder to a dental site.

27. The dental powder applicator of claim 26 further comprising a membrane located within the introductory circumferential plenum chamber extending around the longitudinal axis and substantially surrounding the outer porous wall.

28. The dental powder applicator of claim 26 wherein the inner porous wall comprises a plurality of openings.

29. The dental powder applicator of claim 28 wherein a portion of the openings are adapted to direct pressurized air generally toward the outer porous wall.

30. The dental powder applicator of claim 28 wherein a portion of the openings are adapted to direct pressurized air randomly within the powder reservoir.

31. The dental powder applicator of claim 28 wherein the openings comprise a regular or irregular pattern in the inner porous wall.

32. The dental powder applicator of claim 28 wherein the openings direct pressurized air into the powder reservoir to substantially fluidize the dental powder.

33. The dental powder applicator of claim 26 wherein the powder reservoir comprises a cartridge releasably attached to the desiccant chamber.

34. The dental powder applicator of claim 26 wherein the applicator tube is releasably attached to the powder applicator.

37. The dental powder applicator of claim 26 wherein the applicator tube is rotatably attached to the powder applicator.

38. A method of delivering dental powder to a dental site comprising the steps of:

- introducing pressurized air into a desiccant chamber of an orientation independent dental powder applicator through a first air input opening;
- desiccating the pressurized air;
- directing the desiccated pressurized air into a powder reservoir;
- circumferentially fluidizing the dental powder contained in the powder reservoir with the desiccated pressurized air;
- directing the fluidized dental powder and desiccated pressurized air towards an applicator tube along a longitudinal axis of the orientation independent dental powder applicator;
- directing the fluidized dental powder and desiccated pressurized air through the applicator tube, the applicator tube comprising a distal end directed towards the dental site.

39. The method of claim 38 further comprising the step of connecting the orientation independent dental powder applicator to a pressurized air source at a first end of the desiccant chamber.

40. The method of claim 38 further comprising the step of directing the fluidized dental powder and desiccated pressurized air through an acceleration chamber, the acceleration chamber comprising an air foil adapted to promote continuous flow of the fluidized dental powder and desiccated pressurized air.

41. The method of claim 38 further comprising the step of controlling delivery of the dental powder with a pressurized air manual switch.

42. The method of claim 38 further comprising the step of controlling delivery of the dental powder with a foot pedal.

43. The method of claim 38 further comprising the step of controlling delivery of the dental powder with a control rod actuator.

44. The method of claim 38 further comprising the step of introducing pressurized air into a second air input opening fluidly coupled to a control rod, the control rod comprising a fluid path adapted to deliver supplemental pressurized air.

45. The method of claim 38 further comprising the step of directing the dental powder onto the dental site by rotating the applicator tube.

46. The method of claim 38 further comprising the step of replacing the applicator tube after application of dental powder to a dental site.

47. The method of claim 38 further comprising the step of replacing the tip of the applicator tube after application of powder to a dental site.

48. The method of claim 38 further comprising the step of replacing the powder reservoir with a new cartridge of dental powder.

49. The method of claim 38 further comprising the step of refilling the powder reservoir with a new cartridge of dental powder.